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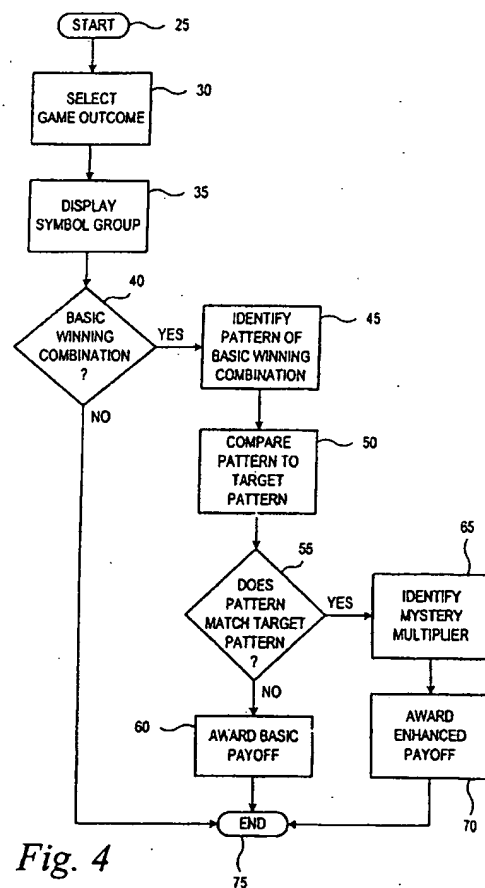
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(54) **Slot machine with pattern-driven award feature**

(57) A pattern-based award system for a slot machine. In one embodiment, a basic payoff is made if a symbol group displayed on the slot machine includes a basic winning combination and a supplemental payoff is made if the basic winning combination matches a target pattern. In another embodiment, an enhanced payoff is made if the symbol group displayed on the slot machine includes a basic winning combination which matches a target pattern; otherwise, a basic payoff is made if the symbol group includes a basic winning combination which does not match the target pattern. The basic payoff in each embodiment comprises a predefined amount of coin(s) or credit(s) or a randomly selected mystery amount. The supplemental or enhanced payoff is the product of the basic payoff amount and a randomly selected mystery multiplier.



*Fig. 4*

## Description

### FIELD OF THE INVENTION

[0001] The present invention relates generally to gaming machines and, more particularly, to a slot machine with a pattern-driven award feature.

### BACKGROUND OF THE INVENTION

[0002] Slot machines are well-known gaming devices including a plurality of reels rotatable about a common axis. In a typical reel-type slot machine, a payoff of coin(s) or credit(s) is made to a player whenever certain winning combinations of symbols are displayed on the reels relative to an active payline. Generally, in order to stimulate player interest in such machines, it is desirable that such machines include features that are intrinsically entertaining to the player and which present (or will be perceived to present) greater payoff opportunities relative to other available gaming options. The greater the perceived payoff opportunities associated with a particular machine, and the more entertaining the machine, the greater likelihood that such machine will attract frequent play and thereby produce greater revenues for the casino operator.

[0003] One feature which has been successfully employed to enhance the entertainment and perceived payoff value of a game is that of a special wildcard symbol which, when displayed on the reels relative to an active payline, may be substituted for a winning symbol if the other reels display part of a winning combination. The wildcard symbol may trigger an award of coin(s) or credit(s) which is supplemental to the "regular" payout. One such game is described in U.S. Patent No. 5,449,173, assigned to the assignee of the present invention and incorporated herein by reference. The wildcard symbol may comprise a special award multiplier symbol which multiplies the regular payout by a predefined amount. Another common feature, which may be provided in games with or without a special award multiplier symbol, is that of multiple paylines, "scatter pay" paylines or unusually-shaped paylines. Such games award "regular" payouts when winning combinations occur under an active payline and can provide supplemental or multiplied awards when a special wildcard or award multiplier symbol is displayed under an active payline.

[0004] Because slot machines offering supplemental and multiplied awards are generally more popular than slot machines offering only "regular" payouts, there is a continuing need to develop new types of such games to satisfy player and operator demands. The present invention is directed to satisfying this need.

### SUMMARY OF THE INVENTION

[0005] In accordance with one aspect of the present

invention, there is provided a pattern-based award system for a slot machine having means for randomly selecting a game outcome and means for displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions. The system includes symbol evaluation means for determining whether the symbol group includes a basic winning combination. If the symbol group is determined to include a basic winning combination, the display positions of the symbols in the combination are compared to a target pattern. If the symbol group includes a basic winning combination which does not match the target pattern, a basic payoff is made to the player. Depending on the symbol combination, the basic payoff comprises either a predefined amount of coin(s) or credit(s) or a randomly selected mystery amount. If the symbol group includes a basic winning combination which matches the target pattern, an enhanced payoff is made to the player. In one embodiment, the enhanced payoff is the product of the basic payoff associated with the winning combination and a randomly selected mystery multiplier.

[0006] In accordance with another aspect of the present invention, there is provided a pattern-based award system for a slot machine having means for randomly selecting a game outcome and means for displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions. The system includes symbol evaluation means for determining whether the symbol group includes a basic winning combination. If the symbol group is determined to include a basic winning combination, a basic payoff is made to the player. Depending on the symbol combination, the basic payoff comprises either a predefined amount of coin(s) or credit(s) or a randomly selected mystery amount. Then, the display positions of the symbols in the combination are compared to a target pattern. If the symbol group includes a basic winning combination which matches the target pattern, a supplemental payoff is made to the player. In one embodiment, the supplemental payoff is the product of the basic payoff associated with the winning combination and a randomly selected mystery multiplier.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The foregoing and other advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings in which:

FIG. 1a is a simplified illustration of a spinning reel slot machine with dot matrix display on which the present invention may be implemented;

FIG. 1b is a block diagram of a control system for the slot machine of FIG. 1a;

FIG. 2 is an illustration of three reel strips which may

be placed on the reels of the slot machine of FIG. 1 to implement the present invention;

FIG. 3 is a pay table identifying various winning combinations and associated basic payoff amounts which may occur using the reel strips of FIG. 2;

FIG. 4 is a flow diagram identifying various steps in implementation of the pattern-based award multiplier system according to the present invention;

FIG. 5 is a math table summarizing basic and enhanced payoff probabilities and expected values associated with the winning combinations identified in FIG. 3.

**[0008]** While the invention is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. However, it should be understood that the invention is not intended to be limited to the particular forms disclosed. Rather, the invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

#### DESCRIPTION OF SPECIFIC EMBODIMENTS

**[0009]** Turning now to the drawings and referring initially to FIG. 1a, there is depicted a slot machine 10 on which the present invention may be implemented. The slot machine 10 includes a display window 12 through which a player may observe three spinning reels, 14, 16 and 18. The slot machine further includes a video display 22 for displaying various graphics associated with the game. The video display 22 may comprise a dot matrix, CRT, LED, electro-luminescent display or generally any type of video display known in the art. It will be appreciated that the game may be implemented entirely in video in embodiments without mechanical reels 14, 16, 18.

**[0010]** FIG. 1b is a block diagram of a control system suitable for operating the slot machine 10 of FIG. 1a. Coin/credit detector 24 signals a processor 26 when a player has inserted a number of coins or played a number of credits. Then, after the player has activated a switch 28 (e.g., by pulling lever 20 or pushing a button), the processor 26 initiates basic game play by setting reels 14, 16, 18 in motion, randomly selecting a stop position of the reels 14, 16, 18 and, using technology well known in the art, causing a reel motor and step controller 32 to stop the reels 14, 16, 18 at the selected stop position. A rotational position detector 34 provides feedback to the processor 26 to ensure that the reels 14, 16, 18 are stopped at the correct stop position. The symbols displayed on the reels at the preselected stop position define the basic game outcome.

**[0011]** A system memory 36 stores control software, operational instructions and data associated with the slot machine 10. In one embodiment, the memory 36 comprises a separate read-only memory (ROM) and

battery-backed random-access memory (RAM). However, it will be appreciated that the memory 36 may be implemented on any of several alternative types of memory structures or may be implemented on a single memory structure. A payoff mechanism 38 is operable in response to instructions from the processor to award a payoff of coins or credits to the player in response to certain winning combinations stored in memory 36. As will be described in detail hereinafter, the payoff amount of certain combinations is predetermined according to a pay table stored in system memory 36.

**[0012]** As best observed in FIG. 1a, the symbols on reels 14, 16, 18 are displayed in a symbol group consisting of nine symbols, with each symbol being displayed in either an upper, center, or lower display position on one of the reels 14, 16, 18. It will be appreciated, however, that any of several alternative symbol group configurations may be employed, for example, where the slot machine 10 has fewer or greater numbers of reels, and/or where fewer or greater numbers of symbols are visible in the display window 12. The symbol group is determined to include a winning combination (e.g., a symbol combination resulting in a payment of coins or credits) if it includes a combination of symbols which correspond to a predefined winning combination. Predefined winning combinations and associated payoff amounts for the game are stored in the system memory 36 and are also shown in a pay table. The pay table (not shown in FIG. 1) is typically affixed to the slot machine 10 so that players may view the possible winning combinations and associated payoff amounts.

**[0013]** Traditionally, the combination of symbols which determine the game outcome (and which must correspond to a predefined winning combination to be a winning combination) consist of only those symbols which are aligned directly "under" one or more fixed paylines. Known configurations of fixed paylines include center paylines (where the combination of symbols consisting of the center symbol on each reel comprises the game outcome), upper paylines (where the combination of symbols consisting of the upper symbol on each reel comprises the game outcome), lower paylines (where the combination of symbols consisting of the lower symbol on each reel comprises the game outcome), angled paylines (where the combination of symbols consisting of the lower, center and upper symbols, respectively, or upper, center and lower symbols, respectively, on the three reels comprises the game outcome) or diamond-shaped paylines (where the combination of symbols consisting of the center symbol on the first and third reels and either the upper or lower symbol on the second reel comprises the game outcome). In either of these games, a "basic" payoff of coin(s) or credit(s) is made if the symbol combination defining the game outcome corresponds to a winning combination identified on the pay table stored in system memory 36. Supplemental or bonus payoffs may also be made if one or more of the symbols in the symbol combination include a special wild-

card, bonus or multiplier symbol.

[0014] The present invention employs a "scatter pay" concept in which most of the symbol combinations defining the game outcome(s) are not required to be aligned with fixed payline(s). More specifically, with the "scatter pay" feature, the symbol group is determined to include a basic winning combination if any combination of three symbols consisting of one symbol from each of the three reels corresponds to one of the symbol combinations identified in the pay table. Thus, for example, suppose the symbol combination SYMBOL1, SYMBOL2, SYMBOL3 is a basic winning combination of a game played on the slot machine 10. In scatter-pay format, the winning combination occurs if reel 14 displays SYMBOL1 in either of the upper, center or lower display positions, reel 16 displays SYMBOL2 in either of the upper, center or lower display positions (which need not correspond to the display position of SYMBOL1 on reel 14) and reel 18 similarly displays SYMBOL3 in either of the upper, center or lower display positions (which need not correspond to the display positions of SYMBOL 1 or SYMBOL2 on reel 14 or 16).

[0015] FIG. 2 shows a set of reel strips for use with a slot machine of the type shown in FIG. 1 to implement a STROKE OF LUCK™ slot machine game, assigned to the assignee of the present invention. The reel strips correspond to the reels 14, 16, 18 in FIG. 1 and will be identified by corresponding reference numerals 14, 16, 18. Each of the reel strips 14, 16, 18 include twenty-four symbols (including "blanks"), corresponding to twenty-four available reel stopping positions. The symbols which appear on reel strip 14 include, in sequence, Strawberry, Blank, Mystery, Blank, Strawberry, Blank, Mystery, Blank, Diamond, Blank, Strawberry, Blank, 3 Bar, Blank, Orange, Blank, 2 Bar, Blank, 7, Blank, 1 Bar, Blank, 7 and Blank. The symbols which appear on reel strip 16 include, in sequence, Strawberry, Blank, 1 Bar, Blank, Strawberry, Blank, 1 Bar, Blank, 7, Blank, Mystery, Blank, 3 Bar, Blank, Mystery, Blank, 2 Bar, Blank, Diamond, Blank, 1 Bar, Blank, Orange and Blank. Finally, the symbols which appear on reel strip 18 include, in sequence, Strawberry, Blank, 7, Blank, Strawberry, Blank, Orange, Blank, Strawberry, Blank, Diamond, Blank, 3 Bar, Blank, Mystery, Blank, 2 Bar, Blank, Mystery, Blank, 1 Bar, Blank, Mystery and Blank.

[0016] Winning combinations and payoffs associated with the STROKE OF LUCK™ game are shown in the pay table of FIG. 3. The "3 Bars," "2 Bars," "1 Bars," "Any Bars," "Oranges," "Strawberries" and "Mystery Coins" combinations identified in the left hand column of FIG. 3 are various basic winning combinations which may arise in the STROKE OF LUCK™ game, each of which will result in a basic payoff if they occur in a scatter-pay format and an enhanced or supplemental payoff if they occur in a pattern which matches a target pattern. The basic winning combination "Any Bars" occurs if any combination of "1 Bar," "2 Bar" and "3 Bar" symbols is displayed in scatter pay format on the reels 14, 16, 18.

Otherwise, each of the other combinations require that a designated symbol (e.g., "3 Bar," "2 Bar," "1 Bar," "Orange," "Strawberry" and "Mystery") be displayed in scatter pay format on the reels 14, 16, 18. The amounts of the basic payoffs associated with the respective basic winning combinations are identified in the pay table corresponding to the numbers of coins played and are stored in system memory 36. For example, the basic payoff for the "3 BAR" combination is 40 coins or credits for 1 coin played and 80 coins or credits for two or more coins played; the basic payoff for the "2 BAR" combination is 20 coins or credits for 1 coin played and 40 coins or credits for two or more coins played; the basic payoff for the "1 BAR" combination is 10 coins or credits for 1 coin played and 20 coins or credits for two or more coins played; the basic payoff for the "Any BAR" combination is 5 coins or credits for 1 coin played and 10 coins or credits for two or more coins played; the basic payoff for the "Orange" combination is 4 coins or credits for 1 coin played and 8 coins or credits for two or more coins played; and the basic payoff for the "Strawberry" combination is 2 coins or credits for 1 coin played and 4 coins or credits for two or more coins played.

[0017] The basic payoff for the "MYSTERY COINS" combination is not a predetermined amount, but rather comprises a "mystery" payoff which is randomly selected by the processor from a set of predefined mystery payoff amounts stored in system memory 36. The set of mystery payoff amounts from which the mystery payoff is selected differs according to the number of coins played. In one embodiment, the mystery payoff in a 1-coin game comprises 2, 5 or 10 coins; the mystery payoff in a 2-coin game comprises 5, 10 or 15 coins; the mystery payoff in a 3-coin game comprises 10, 15, 20, 25 or 50 coins; and the mystery payoff in a 4-coin game comprises 15, 20, 25, 50 or 100 coins. It will be appreciated that the number of selection elements and associated payoff amounts identified above may be varied to effect different payouts by altering the game program.

[0018] In a 1-coin game, the set of mystery payoff amounts in one embodiment comprises 9 individual payoff amounts, each of which has a one-in-nine chance to be selected. The individual payoff amounts are: 2 (5 occurrences), 5 (2 occurrences) and 10 (2 occurrences). The probability of selecting a particular payoff amount is determined by dividing the number of occurrences of that particular amount in the set by the total number of number of payoff amounts in the set. Therefore, in a 1-coin game with a set of mystery payoff amounts as defined above, the probability of selecting a "2" is 55% (five divided by nine), the probability of selecting a "5" is 22% (two divided by nine) and the probability of selecting a "10" is 22% (two divided by nine). The average mystery payoff amount in the 1-coin game is 4.444.

[0019] For a 2-coin game, the set of mystery payoff amounts in one embodiment comprises 6 individual payoff amounts, having respective payoff amounts of 5

(4 occurrences), 10 (1 occurrence) and 15 (1 occurrence). Therefore, in a 2-coin game, the probability of selecting a "5" is 66% (four divided by six), the probability of selecting a "10" is 17% (one divided by six), and the probability of selecting a "15" is 17% (one divided by six). The average mystery payoff amount in the 2-coin game is 7.5.

**[0020]** For a 3-coin game, the set of mystery payoff amounts in one embodiment comprises 12 individual payoff amounts, having respective payoff amounts of 10 (2 occurrences), 15 (4 occurrences), 20 (1 occurrence), 25 (2 occurrences) and 50 (3 occurrences). Therefore, in a 3-coin game, the probability of selecting a "10" is 17% (two divided by twelve), the probability of selecting a "15" is 33% (four divided by twelve), the probability of selecting a "20" is 8% (one divided by twelve), the probability of selecting a "25" is 17% (two divided by twelve) and the probability of selecting a "50" is 25% (three divided by twelve). The average mystery payoff amount in the 3-coin game is 25.

**[0021]** For a 4-coin game, the set of mystery payoff amounts in one embodiment comprises 13 individual payoff amounts, having respective payoff amounts of 15 (2 occurrences), 20 (4 occurrences), 25 (5 occurrences), 50 (1 occurrence), and 100 (1 occurrence). Therefore, in a 4-coin game, the probability of selecting a "15" is 15% (two divided by thirteen), the probability of selecting a "20" is 31% (four divided by thirteen), the probability of selecting a "25" is 38% (five divided by thirteen), the probability of selecting a "50" is 8% (one divided by thirteen) and the probability of selecting a "100" is 8% (one divided by thirteen). The average mystery payoff amount in the 4-coin game is 29.61538.

**[0022]** As may be observed in the pay table of FIG. 3, the 7-7-7 combination is a basic winning combination which is available only upon playing three or more coins in the STROKE OF LUCK™ game. Similarly, the "Diamonds" combination is a basic winning combination which is available only upon playing four coins. These combinations are known in the art as "buy-a-pay" combinations, in which the play of coin(s) or credit(s) in an amount exceeding a certain threshold "buys" additional predetermined winning combinations. In the STROKE OF LUCK™ game, the "buy-a-pay" concept is used in conjunction with both scatter-pay paylines and the traditional "center" payline. Specifically, in the STROKE OF LUCK™ game, the play of three or more coins or credits "buys" the basic symbol combination 7-7-7. Upon the occurrence of the 7-7-7 combination in scatter-pay format, if at least three coins or credits were played, the player will be awarded a basic payoff amount of 75 coins or credits. Otherwise, with less than three coins or credits played, the 7-7-7 combination will be a losing combination. The play of four coins or credits "buys" the "DIAMONDS" symbol combination. Upon the occurrence of the "DIAMONDS" symbol combination, if four coins or credits are played, the player will be awarded a basic payoff amount of 100 coins or credits if the com-

bination is displayed in scatter-pay format or a basic payoff amount of 500 coins if displayed on the center payline. Otherwise, with less than four coins or credits played, the "DIAMONDS" combination will be a losing combination even if it is displayed on the center payline.

**[0023]** In accordance with one aspect of the present invention, any of the basic payoff amounts in the STROKE OF LUCK™ game, including the selected mystery payoff amount or the "buy-a-pay" combinations, are subject to multiplication by a "mystery multiplier" thereby resulting in either an enhanced or supplemental award to the player. Generally, as will be described in detail hereinafter, the mystery multiplier is triggered only if the winning symbol combination is displayed in a pattern which matches a target pattern. Similar to the "mystery coins" award, the particular mystery multiplier operable in the game is not predetermined, but rather is determined by the processor making a random selection from a predefined set of mystery multipliers stored in game memory. The set of mystery multipliers from which the mystery multiplier is selected differs according to the number of coins played. In one embodiment, the mystery multipliers in a 1-coin game comprise either 2X or 3X multipliers; the mystery multipliers in a 2-coin game comprise either 2X, 3X or 4X multipliers; the mystery multipliers in a 3-coin game comprise either 2X, 3X, 4X or 5X multipliers; and the mystery multipliers in a 4-coin game comprise either 2X, 3X, 4X, 5X, 10X or 15X multipliers. It will be appreciated that the number and/or magnitude of mystery multipliers may be varied to effect different payouts by altering the game program.

**[0024]** In a 1-coin game, the set of mystery multipliers in one embodiment comprises 6 individual mystery multipliers, each of which has a one-in-six chance to be selected. The individual multiplier values are 2X (4 occurrences) and 3X (2 occurrences). The probability of selecting a particular multiplier value is determined by dividing the number of occurrences of that particular multiplier in the set by the total number of multipliers in the set. Therefore, in a 1-coin game with a set of mystery multipliers as defined above, the probability of selecting a "2X" multiplier is 67% (four divided by six) and the probability of selecting a "3X" multiplier is 33% (two divided by six). The average mystery multiplier value in the 1-coin game is 2.333.

**[0025]** For a 2-coin game, the set of mystery multipliers in one embodiment comprises 5 individual mystery multipliers, having respective values of 2X (3 occurrences), 3X (1 occurrence) and 4X (1 occurrence). Therefore, in a 2-coin game, the probability of selecting a "2X" multiplier is 60% (three divided by five), the probability of selecting a "3X" multiplier is 20% (one divided by five), and the probability of selecting a "4X" multiplier is 20% (one divided by five). The average mystery multiplier value in the 2-coin game is 2.6.

**[0026]** For a 3-coin game, the set of mystery multipliers in one embodiment comprises 8 individual mystery multipliers, having respective values of 2X (4 occurrences), 3X (2 occurrences), 4X (1 occurrence), 5X (1 occurrence), 10X (1 occurrence) and 15X (1 occurrence). Therefore, in a 3-coin game, the probability of selecting a "2X" multiplier is 50% (four divided by eight), the probability of selecting a "3X" multiplier is 25% (two divided by eight), the probability of selecting a "4X" multiplier is 12.5% (one divided by eight), the probability of selecting a "5X" multiplier is 12.5% (one divided by eight), the probability of selecting a "10X" multiplier is 12.5% (one divided by eight) and the probability of selecting a "15X" multiplier is 12.5% (one divided by eight). The average mystery multiplier value in the 3-coin game is 3.125.

es), 3X (2 occurrences), 4X (1 occurrence), and 5X (1 occurrence). Therefore, in a 3-coin game, the probability of selecting a "2X" multiplier is 50% (four divided by eight), the probability of selecting a "3X" multiplier is 25% (two divided by eight), the probability of selecting a "4X" multiplier is 12.5% (one divided by eight) and the probability of selecting a "5X" multiplier is 12.5% (one divided by eight). The average mystery multiplier value in the 3-coin game is 2.875.

[0027] For a 4-coin game, the set of mystery multipliers in one embodiment comprises 15 individual mystery multipliers, having respective values of 2X (4 occurrences), 3X (5 occurrences), 4X (2 occurrences), 5X (2 occurrences), 10X (1 occurrence) and 15X (1 occurrence). Therefore, in a 4-coin game, the probability of selecting a "2X" multiplier is 27% (four divided by fifteen), the probability of selecting a "3X" multiplier is 33% (five divided by fifteen), the probability of selecting a "4X" multiplier is 13% (two divided by fifteen), the probability of selecting a "5X" multiplier is 13% (two divided by fifteen), the probability of selecting a "10X" multiplier is 7% (one divided by fifteen) and the probability of selecting a "15X" multiplier is 7% (one divided by fifteen). The average mystery multiplier value in the 4-coin game is 4.4.

[0028] In one embodiment, as illustrated in FIG. 1, a video display 22 is provided for displaying various animations associated with the game. These animations include, for example, attract mode animations and animations associated with winning game outcomes. The display 22 may also show the pay table associated with the game. In one embodiment, where the symbol group includes a basic winning combination, the symbols forming the combination are displayed on the video display 22. Upon occurrence of the "Mystery" symbol combination, the video display 22 shows an animation depicting the selection of the mystery coin, including a display of the selected mystery coin amount. Similarly, upon the occurrence of a symbol combination in a pattern which triggers the mystery multiplier, the video display 22 shows an animation depicting the selection of the mystery multiplier, including a display of the selected mystery multiplier value and a display of the supplemental award value (defined by the product of the mystery multiplier value and the basic award). The video display 22 may comprise a dot matrix, CRT, LED, electro-luminescent display or generally any type of video display known in the art. It will be appreciated that the slot machine game may be implemented entirely in video (e.g., with spinning reels simulated in video) in gaming machines not having mechanical reels 14, 16, 18.

[0029] FIG. 4 is a flow diagram identifying various steps in implementation of the pattern-based award feature of the present invention. Each of the steps will be described with reference to the STROKE OF LUCK™ game. It will be appreciated, however, that the present invention is not limited to the STROKE OF LUCK™ game or any other particular game. Start of the game (step 25) is triggered by the play of one or more coin(s)

or credits, then pulling a lever or depressing a push button to set the reels in motion. The reels may comprise mechanical reels (e.g., reels 14, 16, 18 of FIG. 1) or simulated mechanical reels illustrated on a video display. A processor (e.g., CPU) then operates according to its game program to randomly select a game outcome (step 30) and to display a symbol group representing the game outcome (step 35). In a slot machine of the type shown in FIG. 1, the symbol group consists of nine symbols (including "blanks") displayed at nine respective display positions, with three symbols being displayed on each reel. The symbol group in other embodiments may consist of different numbers and/or configurations of symbols, depending on the number of reels (or simulated reels) and the number of display positions on each reel.

[0030] In step 40, a symbol evaluation means (e.g., the processor) determines whether the displayed symbol group includes a basic winning combination. This is accomplished in one embodiment by identifying selected symbol combinations in the symbol group and comparing the selected symbol combinations to a plurality of predefined basic winning combinations stored in game memory (and which are displayed in the pay table of FIG. 3). In the STROKE OF LUCK™ game, for example, the processor identifies 27 different three-symbol combinations, each consisting of one symbol on each reel in either of the three possible display positions. The predefined winning combinations similarly consist of various three-symbol combinations (see the pay table of FIG. 3). If either of the selected symbol combinations match one of the predefined basic winning combinations, the matching combination is identified as a basic winning combination and the game proceeds to step 45. A game having reached step 45 is guaranteed to pay at least a basic payoff (at step 60) and perhaps an enhanced payoff (at step 65), as will be described hereinafter. If none of the selected symbol combinations are determined to match one of the predefined basic winning combinations at step 40, the game is ended (step 70) without making a payoff.

[0031] Generally, in the STROKE OF LUCK™ game, combinations are considered to be basic winning combinations at step 40 if they occur in "scatter-pay" format, with one symbol of the combination appearing on each reel, without regard to whether they are displayed on a payline. It will be appreciated, however, that various alternative symbol combinations may be used to determine whether the symbol group includes a basic winning combination. Such combinations may include, for example, combinations having fewer or greater than three symbols and/or combinations consisting of more than one symbol on each reel.

[0032] In step 45, a pattern recognition means (e.g., the processor) identifies the pattern of the symbols in the basic winning combination, as determined by display positions of the symbols. In the STROKE OF LUCK™ game, the pattern of the basic winning combination

nation may be arranged in any of 27 possible configurations, corresponding to the 27 possible three-symbol combinations consisting of one symbol on each reel. For example, one possible pattern might consist of a first symbol being displayed on an upper display position of the first reel, a second symbol being displayed on a center display position of the second reel and a third symbol being displayed on a center display position of the third reel. Still another pattern might consist of a first symbol being displayed on a lower display position of the first reel, a second symbol being displayed on a lower display position of the second reel and a third symbol being displayed on a lower display position of the third reel. The remaining 25 other possible patterns will be apparent to one skilled in the art and will not be expressly identified herein.

[0033] In step 50, a pattern evaluation means (e.g., the processor) compares the pattern of the symbol combination identified by the pattern recognition means to one or more target patterns stored in game memory and, if the pattern matches the target pattern(s) (step 55), an enhanced payoff is awarded (step 65). Otherwise, if the pattern does not match the target pattern(s), a basic payoff is awarded (step 60). The game is ended (step 70) after having made either a basic payoff at step 60 or enhanced payoff at step 65.

[0034] In one embodiment, each of the target patterns consists of a number of target display positions corresponding to the number of symbols in the basic winning combination. In the STROKE OF LUCK™ game, where the winning combination consists of one symbol on each of three reels, the target pattern(s) are defined to include three target display positions, one on each reel. In one embodiment, for example, a first target pattern is defined to consist of an upper target display position on each of the three reels, a second target pattern consists of a center target display position on each of the three reels and a third target pattern consists of a lower target display position on each of the three reels. In this embodiment, therefore, a supplemental payoff is awarded whenever the symbols defining the basic winning combination are aligned, from left-to-right, on either the upper display position of each reel, center display position of each reel or lower display position of each reel.

[0035] It will be appreciated, however, that the target pattern(s) may be defined in any of several alternative ways. Generally, the target pattern(s) may be defined to include any number of target display positions defining a subset of the universe of possible display positions, regardless of the number of symbols in the winning combination. Thus, for example, in the STROKE OF LUCK™ game, where there are nine possible display positions, the target pattern(s) could be defined to include any number of one to eight display positions.

[0036] In one embodiment, the pattern of the symbol combination is determined to match the target pattern at step 55, and an enhanced payoff is awarded at step 65, if there is a one-to-one correspondence between the

display positions of the symbol combination and the target display positions of the target pattern(s). Otherwise, if there is not a match, a basic payoff is awarded at step 60. Thus, for example, where the symbol combination consists of a first symbol being displayed on a lower display position of the first reel, a second symbol being displayed on a lower display position of the second reel and a third symbol being displayed on a lower display position of the third reel, that symbol combination matches the third target pattern of the STROKE OF LUCK™ game identified above, and therefore an enhanced payoff will be awarded at step 65. However, a symbol combination consisting of a first symbol displayed on an upper display position of the first reel, a second symbol displayed on a center display position of the second reel and a third symbol displayed on a center display position of the third reel does not match either of the three target patterns of the STROKE OF LUCK™ game identified above, and therefore a basic payoff will be awarded at step 60.

[0037] In the STROKE OF LUCK™ game, if a basic payoff is to be awarded at step 60, the amount of the basic payoff comprises a predetermined amount for any symbol combination other than the "Mystery" combination and a "mystery" amount for the "Mystery" symbol combination. The predetermined amount of coins or credits for each combination other than the "Mystery" combination is stored in game memory and shown on the pay table (FIG. 3). The amounts of the basic payoffs differ for each respective combination and for different numbers of coins played. The "mystery" payoff awarded in response to the occurrence of a "Mystery" combination is determined by randomly selected a mystery payoff amount from a set of predefined mystery payoff amounts. As described in relation to FIG. 3, the set of mystery payoff amounts differs for different numbers of coins played.

[0038] In one embodiment, if an enhanced payoff is to be awarded at step 65, the amount of the enhanced payoff is the product of the basic payoff amount corresponding to the winning combination and a randomly selected "mystery multiplier." In one embodiment, the mystery multiplier is randomly selected by an "enhanced payoff means" (e.g., processor) from a set of mystery multipliers stored in game memory. As described in relation to FIG. 3, the set of mystery multipliers from which the mystery multiplier is selected varies according to the number of coins or credits played. In one embodiment, the mystery multipliers in a 1-coin game comprise either 2X or 3X multipliers; the mystery multipliers in a 2-coin game comprise either 2X, 3X or 4X multipliers; the mystery multipliers in a 3-coin game comprise either 2X, 3X, 4X or 5X multipliers; and the mystery multipliers in a 4-coin game comprise either 2X, 3X, 4X, 5X, 10X or 15X multipliers. It will be appreciated, however, that any of several alternative payoff schemes may be implemented in response to the symbol pattern matching the target pattern. For example, the enhanced payoff might con-

sist of a predetermined amount in excess of the basic payoff, or it might consist of the product of the basic payoff with a predefined (rather than mystery) multiplier. Moreover, any of these alternatives may be used in combination. For example, a first predefined multiplier (e.g., IX) might be implemented if the symbol pattern matches a first target pattern, a second predefined multiplier (e.g., 2X) might be used if the symbol pattern matches a second target pattern and a mystery multiplier might be used if the symbol pattern matches a third target pattern.

[0039] Another alternative payoff scheme contemplated in the present invention is that of a supplemental, rather than enhanced, award in response to the symbol pattern matching the target pattern. In this embodiment, the basic payoff could be made at any time after having determined the symbol group to include a basic winning combination. Then, after having made the basic payoff, a supplemental payoff may be awarded if the pattern of the combination is determined to match the target pattern. Like the enhanced payoff discussed in relation to FIG. 4, the supplemental payoff may consist of the product of the basic award with a mystery multiplier or predefined multiplier, or it might consist of a predetermined amount of coin(s) or credit(s). Either of these alternatives could be dependent on the symbol combination and/or the number of coins played.

[0040] For purposes of illustration, three examples corresponding to three different game outcomes of the STROKE OF LUCK™ game will be discussed in relation to FIG. 4. As a first example, suppose that the symbol group displayed at step 35 includes: on the first reel, a "Strawberry" symbol in the upper display position, a "Blank" in the center display position and a "3 Bar" symbol in the lower display position; on the second reel, a "Strawberry" symbol in the upper display position, a "Blank" in the center display position and a "1 Bar" symbol in the lower display position; and on the third reel, a "Blank" symbol in the upper display position, a "Diamond" symbol in the center display position and a "Blank" symbol in the lower display position. In this symbol group, there is no combination of three symbols displayed in scatter pay format which correspond to a winning combination identified in the pay table and therefore the game is ended.

[0041] As a second example, suppose that the symbol group displayed at step 35 includes: on the first reel, a "Strawberry" symbol in the upper display position, a "Blank" in the center display position and a "3 Bar" symbol in the lower display position; on the second reel, a "Blank" symbol in the upper display position, a "Strawberry" in the center display position and a "Blank" symbol in the lower display position; and on the third reel, a "Strawberry" symbol in the upper display position, a "Blank" symbol in the center display position and an "Orange" symbol in the lower display position. This symbol group, which is shown in FIG. 1, will be determined by the symbol evaluation means in step 40 to include a basic winning combination because the "Strawberries"

combination identified in the pay table of FIG. 3 appears in scatter pay format in the display window 12.

[0042] Next, the game proceeds to step 45, where the pattern recognition means identifies the pattern of the symbols in the basic winning combination. In the present example, the pattern consists of a first symbol of the combination (*i.e.*, Strawberry) being displayed on an upper display position of reel 14, a second symbol of the combination (*i.e.*, Strawberry) being displayed on a center display position of reel 16 and a third symbol of the combination (*i.e.*, Strawberry) being displayed on an upper display position of the reel 18. Next, in step 50, the pattern evaluation means compares the pattern of the "Strawberry" combination to three target patterns stored in game memory. A first target pattern consists of an upper target display position on each of the three reels, a second target pattern consists of a center target display position on each of the three reels and a third target pattern consists of a lower target display position on each of the three reels. In this example, the "Strawberry" pattern does not match either of the target patterns and, after making a basic payoff (step 60) of 2 coins or credits (in a 1-coin game) or 4 coins or credits (in a 2-or-more coin game), the game is ended (step 70).

[0043] As a third example, suppose that the symbol group displayed at step 35 includes: on the first reel, a "Strawberry" symbol in the upper display position, a "Blank" in the center display position and a "Mystery" symbol in the lower display position; on the second reel, a "7" symbol in the upper display position, a "Blank" in the center display position and a "Mystery" symbol in the lower display position; and on the third reel, a "3 Bar" symbol in the upper display position, a "Blank" symbol in the center display position and an "Mystery" symbol in the lower display position. This symbol group will be determined by the symbol evaluation means in step 40 to include a basic winning combination because the "Mystery" combination identified in the pay table of FIG. 3 appears in scatter pay format in the display window 12.

[0044] Then, the pattern recognition means in step 45 identifies the pattern of the symbols in the basic winning combination. In the present example, the pattern consists of a first symbol of the combination (*i.e.*, Mystery) being displayed on a lower display position of reel 14, a second symbol of the combination (*i.e.*, Mystery) being displayed on a lower display position of reel 16 and a third symbol of the combination (*i.e.*, Mystery) being displayed on a lower display position of the reel 18. Next, in step 50, the pattern evaluation means compares the pattern of the "Mystery" combination to three target patterns stored in game memory. Where the target patterns are the same as described in the second example above, the "Mystery" pattern does indeed match one of the target patterns, specifically the third target pattern, and the enhanced payoff means is triggered to award an enhanced payoff to the player.

[0045] In one embodiment, the enhanced payoff is the product of the basic payoff associated with the winning



symbol combination (e.g., the Mystery combination in the present example) and a mystery multiplier selected from an appropriate set of mystery multipliers corresponding to the number of coins or credits played. In the present example, the amount of the basic payoff is a "mystery" amount to be selected from an appropriate set of mystery values corresponding to the number of coins or credits played. Similarly, the multiplier has a "mystery" value to be selected from an appropriate set of mystery multipliers. Suppose that two coins or credits have been played, and that the enhanced payoff means selects a basic mystery amount of 5 coins or credits (from a set of mystery payoff values consisting of four "5's", one "10" and one "15"). Then, suppose that the enhanced payoff means selects a mystery multiplier of "4X" (from a set of mystery multipliers consisting of three "2X" multipliers, one "3X" multiplier and one "4X" multiplier). In the present example, then, the amount of the enhanced payoff will be 20 coins or credits (i.e., 5 coins multiplied by 4).

[0046] FIG. 5 summarizes the probabilities and expected values for the winning combinations in the STROKE OF LUCK™ game. The left-hand column of FIG. 5 identifies the various winning combinations (corresponding to the pay table of FIG. 3) that may occur in the STROKE OF LUCK™ game. The notation "(scatter-pay)" following the combination is used to identify those combinations occurring in scatter-pay format that will result in a basic payoff. The notation "(target)" following the combination is used to identify those combinations occurring in a pattern which matches a target pattern and thereby will result in an enhanced payoff. The notation "(center)" following the "Diamond" combination is used to identify the "Diamond" combination occurring on the center payline which will result in an enhanced payoff. The "1 coin," "2 coin," "3-coin" and "4-coin" columns of FIG. 5 lists the pay values of the respective winning outcomes for a 1-coin, 2-coin, 3-coin and 4-coin game. The pay values represent basic payoff amounts for the scatter-pay combinations and enhanced payoff amounts for the combinations matching a target pattern. The pay values associated with the "Mystery" (scatter-pay) combination represent the average mystery amounts available in the 1-coin, 2-coin, 3-coin and 4-coin game, respectively.

[0047] The enhanced payoff amounts for the combinations matching a target pattern represent the product of the basic payoff amount for those combinations and an average mystery multiplier for the number of coins played. For example, the enhanced pay value for the "Diamond" combination occurring on the center payline (available only with 4 coins played) is 2200, which is the product of the basic payoff amount of the "Diamond" combination occurring on the center payline (e.g., 500) and the average mystery multiplier for a 4-coin game (e.g., 4.4). Similarly, the enhanced pay value for the "Mystery" combination is 10.37037 (for a 1-coin game), 19.5 (for a 2-coin game), 71.875 (for a 3-coin game) and

130.3077 (for a 4-coin game). Each of these enhanced pay values is the product of respective basic payoff amounts for the "Mystery" combination (e.g., 4.444 for a 1-coin game, 7.5 for a 2-coin game, 25 for a 3-coin game and 29.61538 for a 4-coin game) and the respective mystery multipliers for a 1-coin, 2-coin, 3-coin and 4-coin game (e.g., 2.333 for a 1-coin game, 2.6 for a 2-coin game, 2.875 for a 3-coin game and 4.4 for a 4-coin game). The enhanced pay values for the remaining combinations are computed in like fashion and will not be described in detail herein.

[0048] The "Probability" column identifies, for each respective symbol combination in the STROKE OF LUCK™ game, the probability of hitting that combination in a single spin. This is computed, generally, by multiplying the number(s) of each symbol on reels 14, 16, 18 to define the number of possible combinations of those symbols relative to a single payline, multiplying that product by the number of paylines attributed to that symbol combination to define an intermediate value, then dividing that intermediate value by the total number of possible symbol combinations, which is 13,824 (e.g.,  $24 \times 24 \times 24$ ) in the STROKE OF LUCK™ game.

[0049] Because no two symbol combinations may be attributed to the same winning outcome, the number of symbol combination supporting a particular outcome is defined to include the combinations which would support *only* that particular outcome. For example, in the STROKE OF LUCK™ game, the "Any Bar" combination would appear to be supported by 45 different combinations (e.g.,  $3 \times 5 \times 3$ ), because the "1 Bar," "2 Bar" and "3 Bar" symbols occupy, in the aggregate, 3 positions on reel 14, 5 positions on reel 16 and 3 positions on reel 18. However, because these 45 combinations include five "1 Bar," "2 Bar" or "3 Bar" combinations, and because those five combinations are attributed to different winning outcomes, the number of combinations supporting *only* the "Any Bar" combination is 40.

[0050] Similarly, the number of paylines supporting a particular outcome is defined to include the paylines that would support *only* that particular outcome. For example, in the STROKE OF LUCK™ game, any of the scatter-pay combinations identified in FIG. 5 would appear to be supported by 27 different "paylines" because there are 27 possible three-symbol scatter-pay combinations. However, because these 27 paylines include the three "target" paylines which will result in enhanced payoffs, the number of paylines supporting *only* the scatter-pay combinations is 24.

[0051] A number of representative calculations of the "Probability" value will hereinafter be described in detail. First, consider the "Diamond (center)" symbol combination. The number of "Diamond" symbols appearing on reels 14, 16 and 18 are 1, 1 and 1, respectively. Because only one payline (e.g., the center payline) is attributable to the "Diamond (center)" symbol combination, the intermediate value is 1 (i.e.,  $1 \times 1 \times 1 \times 1$ ). Thus, there is only one unique symbol combination out of 13,824 pos-

sible symbol combinations that will result in a "Diamond (center)" outcome and the probability of hitting that combination in a single spin is therefore  $7.23E-05$  (i.e.,  $1 \div 13,824$ ).

[0052] Next, consider the "Diamond" (scatter-pay) combination. The number of "Diamond" symbols appearing on reels 14, 16 and 18 are 1, 1 and 1, respectively. The number of paylines supporting the scatter-pay combination is 24 and thus the intermediate value is 24 (i.e.,  $1 \times 1 \times 1 \times 24$ ). Thus, there are 24 symbol combinations out of 13,824 possible symbol combinations that will result in a "Diamond" (scatter-pay) outcome and the probability of hitting that combination in a single spin is therefore 0.001736 (i.e.,  $24 \div 13,824$ ).

[0053] Next, consider the "Diamond" (target) combination. The number of "Diamond" symbols appearing on reels 14, 16 and 18 are 1, 1 and 1, respectively. In the embodiment of the STROKE OF LUCK™ game having three target patterns (e.g., a first target pattern consisting of three upper target display positions, a second target pattern consisting of three center target display positions and a third target pattern consisting of three lower target display positions), there would appear to be three "paylines" supporting the combination. However, because one of those paylines is the center payline attributed to the "Diamond (center)" combination, the number of paylines supporting the "Diamond" (target) combination is 2. Thus, the intermediate value is 2 (i.e.,  $1 \times 1 \times 1 \times 2$ ) and there are 2 symbol combinations out of 13,824 possible symbol combinations that will result in the "Diamond" (target) outcome of FIG. 5. Therefore, the probability of hitting that combination in a single spin is 0.000145 (i.e.,  $2 \div 13,824$ ). The "Probability" values for the remaining combinations are computed in like fashion. The value at the bottom of the "Probability" column (i.e., 0.154297) represents the probability of hitting any winning combination in a single spin.

[0054] The "Pulls/Hit" column in FIG. 5 indicates the number of pulls, on average, that would be required to "hit" the various winning combinations. This is simply the inverse of the "Probability" value for each respective combination. Thus, for example, it would take 576 pulls ( $1 \div 0.001736$ ), on average, to "hit" the "Diamond" (scatter-pay) combination, and it would take 6.48 pulls ( $1 \div 0.154297$ ), on average, to "hit" any winning combination.

[0055] The "1 coin EV" column lists, for each winning outcome, the contribution to expected value attributed to that outcome for a 1-coin game. Each "EV" contribution is computed by multiplying the 1-coin pay value of that combination by the probability of hitting that combination. Thus, for example, the 1-coin EV contribution of the 3 Bar (scatter-pay) combination is 0.069444 ( $40 \times 0.001736$ ). The EV contribution of the remaining combinations are computed in like fashion. The sum of the various "1-coin EV" values (i.e., 0.859616) is the expected value for the STROKE OF LUCK™ game with 1-coin played.

[0056] The "2 coin EV," "3 coin EV" and "4 coin EV" columns list, for each winning outcome, the *normalized* contribution to expected value attributed to that outcome for a 2-coin, 3-coin and 4-coin game, respectively. The normalized contributions to expected value are computed by multiplying the pay value of the combination (corresponding to the number of coins played) by the probability of hitting that combination, then dividing that product by the number of coins played. Thus, for example, the normalized EV contribution of the 1 Bar (target) combination is 0.016927 (i.e.,  $52 \times 0.000651 \div 2$ ) for 2-coins played, 0.012478 (i.e.,  $57.5 \times 0.000651 \div 3$ ) for 3-coins played and 0.014323 (i.e.,  $88 \times 0.000651 \div 4$ ) for 4-coins played. The normalized EV contributions of the remaining combinations are computed in like fashion. The sum of the various "2 coin EV" values (i.e., 0.86263) is the normalized expected value for the STROKE OF LUCK™ game with 2-coins played. Similarly, the sum of the various "3 coin EV" values (i.e., 0.87321) and "4 coin EV" values (i.e., 0.883107) are, respectively, the normalized expected values for the STROKE OF LUCK™ game with 3 and 4 coins played.

[0057] As will be appreciated, different embodiments of the STROKE OF LUCK™ game (or games other than the STROKE OF LUCK™ game) will likely effect different probabilities and expected values in the table of FIG. 5. Such embodiments may include, for example, different mystery payoff values, different mystery multiplier values, different numbers and/or configurations of target pattern patterns, different numbers of reels or different configurations of symbols.

[0058] While the present invention has been described with reference to one or more particular embodiments, those skilled in the art will recognize that many changes may be made thereto without departing from the spirit and scope of the present invention. Each of these embodiments and obvious variations thereof is contemplated as falling within the spirit and scope of the claimed invention, which is set forth in the following claims.

## Claims

1. A pattern-based award method for a slot machine, the method comprising the steps of:

randomly selecting a game outcome in response to play of the slot machine;  
displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions;  
determining whether said symbol group includes a basic winning combination and, if said symbol group is determined to include a basic winning combination,

- identifying the display positions of the symbols in the basic winning combination, the display positions defining in combination a recognized pattern;  
 comparing the recognized pattern to a target pattern defining a number of target display positions;  
 determining whether the recognized pattern matches said target pattern;  
 making a basic payoff to the player if the recognized pattern is not determined to match said target pattern; and  
 making an enhanced payoff to the player if the recognized pattern is determined to match said target pattern, the enhanced payoff having a value greater than the basic payoff.
2. The method of claim 1 wherein the step of determining whether the symbol group includes a basic winning combination comprises the steps of:
- comparing selected combinations of symbols in the symbol group to a plurality of predefined basic winning combinations; and  
 determining the symbol group to include a basic winning combination if one of the selected combinations corresponds to one of the predefined basic winning combinations.
3. The method of claim 1 wherein, if the symbol group is determined to include a basic winning combination and if the recognized pattern is not determined to match the target pattern, the step of making a basic payoff to the player comprises:
- identifying a predetermined payoff amount associated with the basic winning combination; and  
 awarding the predetermined payoff amount to the player.
4. The method of claim 1 wherein, if the symbol group is determined to include a basic winning combination and if the recognized pattern is not determined to match the target pattern, the step of making a basic payoff to the player comprises:
- selecting a mystery payoff amount associated with the basic winning combination; and  
 awarding the mystery payoff amount to the player.
5. The method of claim 4 wherein the step of selecting a mystery payoff amount comprises randomly selecting the mystery payoff amount from a predefined set of mystery payoff amounts.
6. The method of claim 4 wherein the step of selecting a mystery payoff amount comprises:
- determining a number of coins played;  
 identifying a predefined set of mystery amounts associated with the number of coins played; and  
 randomly selecting the mystery payoff amount from the predefined set of mystery payoff amounts.
7. The method of claim 1 wherein, if the symbol group is determined to include a basic winning combination and if the recognized pattern is determined to match the target pattern, the step of making an enhanced payoff to the player comprises:
- identifying a basic payoff amount associated with the basic winning combination;  
 selecting a mystery multiplier;  
 multiplying the basic payoff amount by the mystery multiplier to define an enhanced payoff amount; and  
 awarding the enhanced payoff amount to the player.
8. The method of claim 7 wherein the step of identifying a basic payoff amount comprises identifying a predetermined payoff amount associated with the basic winning combination.
9. The method of claim 7 wherein the step of identifying a basic payoff amount comprises identifying a mystery payoff amount associated with the basic winning combination.
10. The method of claim 7 wherein the step of selecting a mystery multiplier comprises randomly selecting the mystery multiplier from a predefined set of mystery multipliers.
11. The method of claim 7 wherein the step of selecting a mystery multiplier comprises:
- determining a number of coins played;  
 identifying a predefined set of mystery multipliers associated with the number of coins played; and  
 randomly selecting the mystery multiplier from the predefined set of mystery multipliers.
12. The method of claim 1 wherein the step of displaying a symbol group comprises displaying nine symbols at nine corresponding display positions, the nine symbols consisting of three symbols on each of three reels.
13. The method of claim 12 wherein the step of deter-

mining whether the symbol group includes a basic winning combination comprises the steps of:

comparing selected three-symbol combinations of the nine symbols in the symbol group to a plurality of predefined basic winning combinations; and  
determining the symbol group to include a basic winning combination if one of the selected three-symbol combinations corresponds to one of the predefined basic winning combinations.

14. The method of claim 12 wherein the step of determining whether the symbol group includes a basic winning combination comprises the steps of:

comparing selected three-symbol combinations of the symbol group consisting of one symbol from each of the three reels to a plurality of predefined basic winning combinations; and  
determining the symbol group to include a basic winning combination if one of the selected three-symbol combinations consisting of one symbol from each of the three reels corresponds to one of the predefined basic winning combinations.

15. The method of claim 14 wherein, if the symbol group is determined to include a basic winning combination, the step of comparing the recognized pattern to a target pattern comprises comparing the display positions of the symbols in the basic winning combination to a set of target display positions consisting of one target display position on each of the three reels.

16. The method of claim 14 wherein, if the symbol group is determined to include a basic winning combination, the step of comparing the recognized pattern to a target pattern comprises comparing the display positions of the symbols in the basic winning combination to a set of target display positions consisting of an upper target display position on each of the three reels.

17. The method of claim 14 wherein, if the symbol group is determined to include a basic winning combination, the step of comparing the recognized pattern to a target pattern comprises comparing the display positions of the symbols in the basic winning combination to a set of target display positions consisting of a center target display position on each of the three reels.

18. The method of claim 14 wherein, if the symbol group is determined to include a basic winning combination, the step of comparing the recognized pattern to a target pattern comprises comparing the display

positions of the symbols in the basic winning combination to a set of target display positions consisting of a lower target display position on each of the three reels.

19. The method of claim 14 wherein, if the symbol group is determined to include a basic winning combination, the step of comparing the recognized pattern to a target pattern comprises comparing the display positions of the symbols in the basic winning combination to a first set of target display positions consisting of an upper target display position on each of the three reels, a second set of target display positions consisting of a center target display position on each of the three reels and a third set of target display positions consisting of a lower target display position on each of the three reels.

20. A pattern-based award method for a slot machine, the method comprising the steps of:

randomly selecting a game outcome in response to play of the slot machine;  
displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions;  
determining whether said symbol group includes a basic winning combination and, if said symbol group is determined to include a basic winning combination,

making a basic payoff to a player;  
identifying the display positions of the symbols in the basic winning combination, the display positions defining in combination a recognized pattern;  
comparing the recognized pattern to a target pattern defining a number of target display positions;  
determining whether the recognized pattern matches said target pattern;  
making a supplemental payoff to the player if the recognized pattern is determined to match said target pattern.

21. A slot machine for playing a game of chance having a pattern-based award system, the slot machine comprising:

a processor for randomly selecting a game outcome;  
display means for displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions;  
symbol evaluation means for determining whether said symbol group includes a basic

winning combination;

pattern recognition means responsive to the symbol evaluation means for recognizing the display positions of the symbols in the basic winning combination if the symbol group is determined to include a basic winning combination, the display positions defining in combination a recognized pattern;

pattern evaluation means responsive to the symbol evaluation means for comparing the recognized pattern to a target pattern defining a number of target display positions if the symbol group is determined to include a basic winning combination and for determining whether the recognized pattern corresponds to the target pattern;

basic payoff means responsive to the symbol evaluation means and to the pattern evaluation means for making a basic payoff to the player if the symbol group is determined to include a basic winning combination and if the recognized pattern is not determined to match the target pattern; and

enhanced payoff means responsive to the symbol evaluation means and to the pattern evaluation means for making an enhanced payoff to the player if the symbol group is determined to include a basic winning combination and if the recognized pattern is determined to match the target pattern, the enhanced payoff having a value greater than the basic payoff.

22. The slot machine of claim 21 wherein the symbol evaluation means comprises:

means for comparing selected combinations of symbols in the symbol group to a plurality of predefined basic winning combinations; and means for determining the symbol group to include a basic winning combination if one of the selected combinations corresponds to one of the predefined basic winning combinations.

23. The slot machine of claim 21 wherein the basic payoff means comprises:

means responsive to the symbol evaluation means for identifying a predetermined payoff amount associated with the basic winning combination if the symbol group is determined to include a basic winning combination; and means responsive to the pattern evaluation means for awarding the predetermined payoff amount to the player if the recognized pattern is not determined to match the target pattern.

24. The slot machine of claim 21 wherein the basic payoff means comprises:

means responsive to the symbol evaluation means for selecting a mystery payoff amount associated with the basic winning combination if the symbol group is determined to include a basic winning combination; and means responsive to the pattern evaluation means for awarding the mystery payoff amount to the player if the recognized pattern is not determined to match the target pattern.

25. The slot machine of claim 21 wherein the basic payoff means comprises:

means responsive to the symbol evaluation means for randomly selecting a mystery payoff amount from a predefined set of mystery payoff amounts if the symbol group is determined to include a basic winning combination; and means responsive to the pattern evaluation means for awarding the mystery payoff amount to the player if the recognized pattern is not determined to match the target pattern.

26. The slot machine of claim 21 wherein the basic payoff means comprises:

means for determining a number of coins played; means for identifying a predefined set of mystery amounts associated with the number of coins played; means responsive to the symbol evaluation means for randomly selecting a mystery payoff amount from the predefined set of mystery payoff amounts associated with the number of coins played if the symbol group is determined to include a basic winning combination; and means responsive to the pattern evaluation means for awarding the mystery payoff amount to the player if the recognized pattern is not determined to match the target pattern.

27. The slot machine of claim 21 wherein the enhanced payoff means comprises:

payoff identifier means responsive to the symbol evaluation means for identifying a basic payoff amount associated with the basic winning combination if the symbol group is determined to include a basic winning combination; multiplier selection means responsive to the pattern evaluation means for selecting a mystery multiplier if the recognized pattern is determined to match the target pattern; multiplication means responsive to the pattern evaluation means for multiplying the basic payoff amount associated with the basic winning combination by the mystery multiplier to define

an enhanced payoff amount if the recognized pattern is determined to match the target pattern; and

means responsive to the pattern evaluation means for awarding the enhanced payoff amount to the player if the recognized pattern is determined to match the target pattern.

28. The slot machine of claim 27 wherein the basic payoff amount identified by the payoff identifier means comprises a predetermined payoff amount.

29. The slot machine of claim 27 wherein the basic payoff amount identified by the payoff identifier means comprises a mystery payoff amount.

30. The slot machine of claim 27 wherein the multiplier selection means comprises means for randomly selecting the mystery multiplier from a predefined set of mystery multipliers.

31. The slot machine of claim 27 wherein the multiplier selection means comprises:

means for determining a number of coins played;

means for identifying a predefined set of mystery multipliers associated with the number of coins played; and

means for randomly selecting the mystery multiplier from the predefined set of mystery multipliers.

32. The slot machine of claim 21 wherein the display means is operable to display a group of nine symbols at nine corresponding display positions, the nine symbols consisting of three symbols displayed on each of three reels.

33. The slot machine of claim 32 wherein the symbol evaluation means comprises:

means for comparing selected three-symbol combinations obtained from the nine symbols in the symbol group to a plurality of predefined basic winning combinations; and  
means for determining the symbol group to include a basic winning combination if one of the selected three-symbol combinations corresponds to one of the predefined basic winning combinations.

34. The slot machine of claim 32 wherein the symbol evaluation means comprises:

means for comparing selected three-symbol combinations consisting of one symbol from each of the three reels to a plurality of pre-

defined basic winning combinations; and  
means for determining the symbol group to include a basic winning combination if one of the selected three-symbol combinations consisting of one symbol from each of the three reels corresponds to one of the predefined basic winning combinations.

35. The slot machine of claim 34 wherein the pattern evaluation means is operable to compare the display positions of the symbols in the basic winning combination to a set of target display positions consisting of one target display position on each of the three reels if the symbol group is determined to include a basic winning combination.

36. The slot machine of claim 34 wherein the pattern evaluation means is operable to compare the display positions of the symbols in the basic winning combination to a set of target display positions consisting of an upper target display position on each of the three reels if the symbol group is determined to include a basic winning combination.

37. The slot machine of claim 34 wherein the pattern evaluation means is operable to compare the display positions of the symbols in the basic winning combination to a set of target display positions consisting of a center target display position on each of the three reels if the symbol group is determined to include a basic winning combination.

38. The slot machine of claim 34 wherein the pattern evaluation means is operable to compare the display positions of the symbols in the basic winning combination to a set of target display positions consisting of a lower target display position on each of the three reels if the symbol group is determined to include a basic winning combination.

39. The slot machine of claim 34 wherein the pattern evaluation means is operable to compare the display positions of the symbols in the basic winning combination to a first set of target display positions consisting of an upper target display position on each of the three reels, a second set of target display positions consisting of a center target display position on each of the three reels and a third set of target display positions consisting of a lower target display position on each of the three reels if the symbol group is determined to include a basic winning combination.

40. A slot machine for playing a game of chance having a pattern-based award system, the slot machine comprising:

a processor for randomly selecting a game out-

come;

display means for displaying a symbol group associated with the game outcome, the symbol group consisting of a plurality of symbols displayed at a plurality of display positions;

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symbol evaluation means for determining whether said symbol group includes a basic winning combination;

basic payoff means responsive to the symbol evaluation means for making a basic payoff to the player if the symbol group is determined to include a basic winning combination;

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pattern recognition means responsive to the symbol evaluation means for recognizing the display positions of the symbols in the basic winning combination if the symbol group is determined to include a basic winning combination, the display positions defining in combination a recognized pattern;

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pattern evaluation means responsive to the symbol evaluation means for comparing the recognized pattern to a target pattern defining a number of target display positions if the symbol group is determined to include a basic winning combination and for determining whether the recognized pattern corresponds to the target pattern; and

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supplemental payoff means responsive to the symbol evaluation means and to the pattern evaluation means for making a supplemental payoff to the player if the symbol group is determined to include a basic winning combination and if the recognized pattern is determined to match the target pattern.

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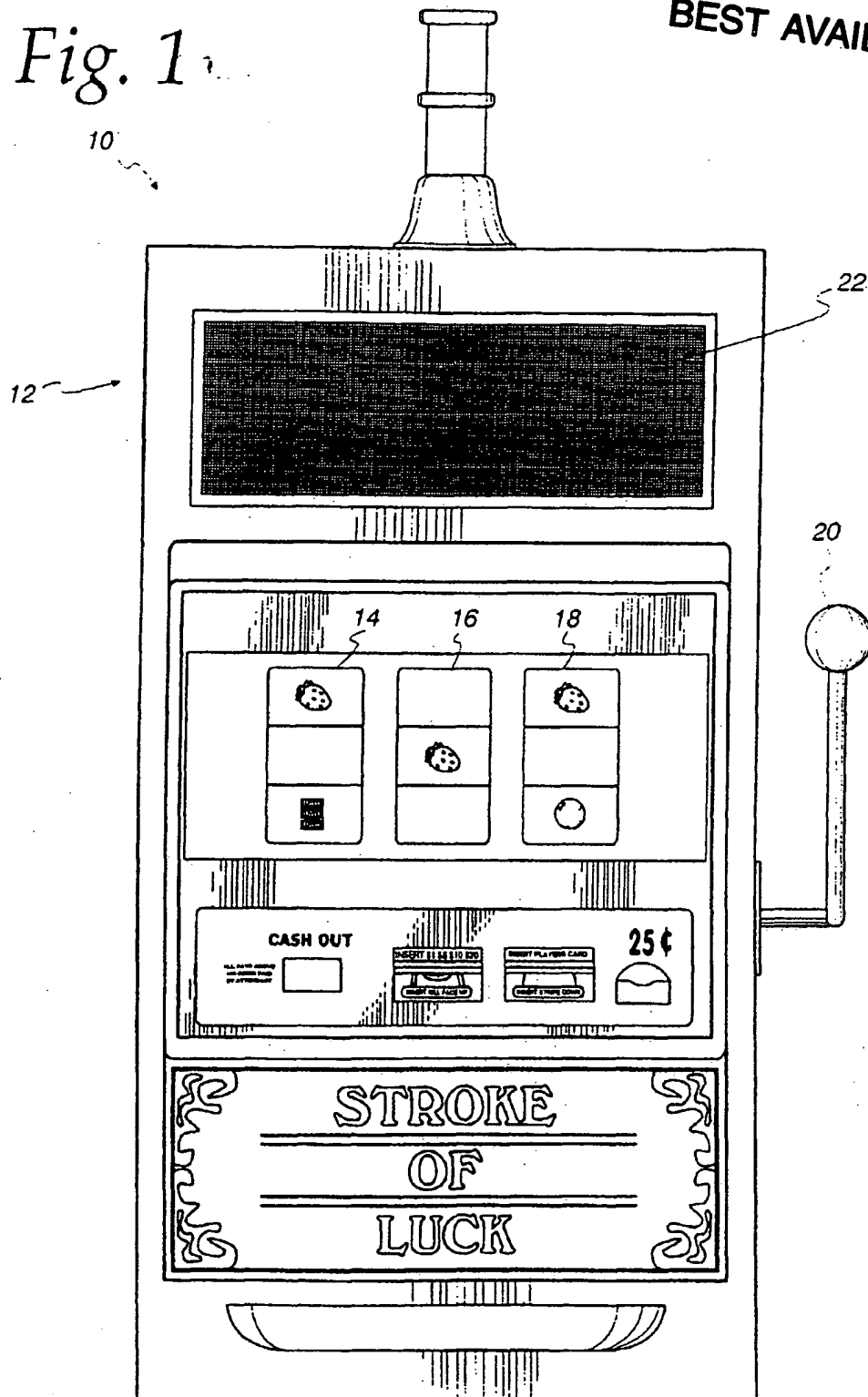
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Fig. 1





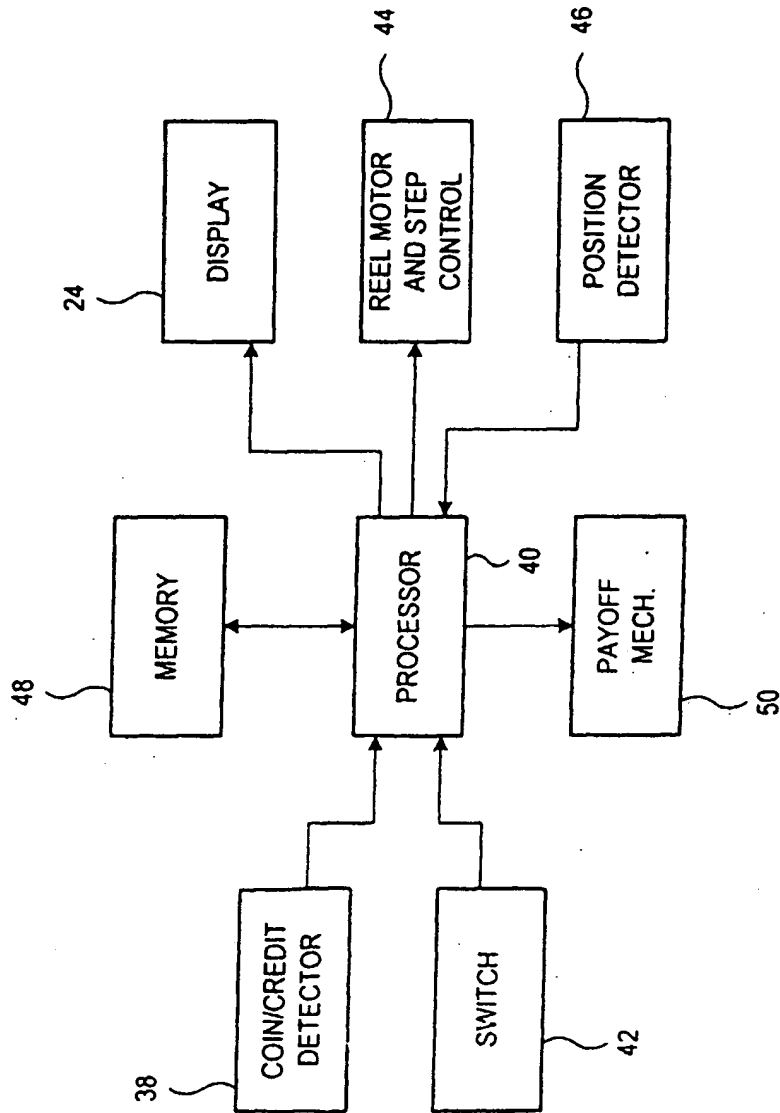


FIG. 1b

Fig. 2



























































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Fig. 3

	1 COIN	2 COIN	3 COIN	4 COIN
	40	80	 PAYS 75	 PAY 100  PAY 500 ON CENTERLINE
	20	40		
	10	20		
ANY   	5	10		
	4	8		
	2	4	10-50	15-100
	2-10	5-15		
	2X-3X	2X-4X	2X-5X	2X-15X
 PLAY 4 COIN TO WIN UP TO 7500 (THREE DIAMONDS ON CENTER LINE WITH 15X MYSTERY MULTIPLIER)				

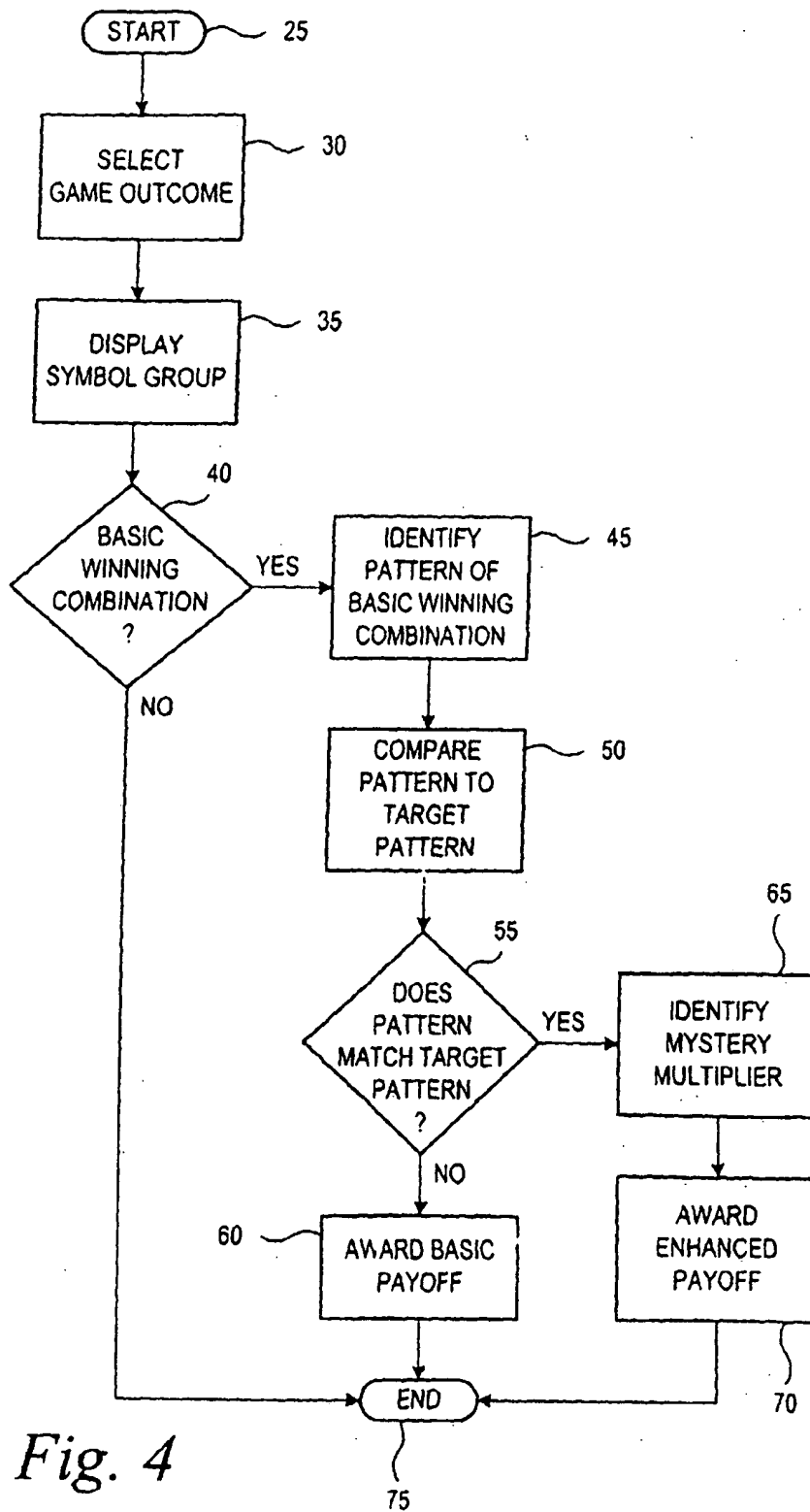


Fig. 4

BASIC PAYOFF SUMMARY TABLE

	1 coin	2 coin	3 coin	4 coin	Prob	Hits	1 coin EV	2 coin EV	3 coin EV	4 coin EV
DIAMOND (center)	0	0	0	2200	7.23E-05	13824	0	0	0	0.039786
DIAMOND (target)	0	0	0	440	0.000145	6912	0	0	0	0.015914
DIAMOND (scatter-pay)	0	0	0	100	0.001736	576	0	0	0	0.043403
7 (target)	0	0	215.625	330	0.000434	2304	0	0	0.031196	0.035807
7 (scatter-pay)	0	0	75	75	0.003472	288	0	0	0.086806	0.065104
MYSTERY (target)	10.37037	19.5	71.875	130.3077	0.002604	384	0.027006	0.025391	0.062391	0.084836
MYSTERY (scatter-pay)	4.44444	7.5	25	29.61538	0.020833	48	0.092593	0.078125	0.173611	0.154247
3BAR (target)	93.33333	208	230	352	0.000217	4608	0.020255	0.022569	0.016638	0.019097
3BAR (scatter-pay)	40	80	80	80	0.001736	576	0.069444	0.069444	0.046296	0.034722
2BAR (target)	46.66667	104	115	176	0.000217	4608	0.010127	0.011285	0.008319	0.009549
2BAR (scatter-pay)	20	40	40	40	0.001736	576	0.034722	0.034722	0.023148	0.017361
1BAR (target)	23.33333	52	57.5	88	0.000651	1536	0.015191	0.016927	0.012478	0.014323
1BAR (scatter-pay)	10	20	20	20	0.005208	192	0.052083	0.052083	0.034722	0.026042
anybar (target)	11.66667	26	28.75	44	0.008681	115.2	0.101273	0.112847	0.083189	0.095486
anybar (scatter-pay)	5	10	10	10	0.059444	14.4	0.347222	0.347222	0.231481	0.173611
ORANGE (target)	9.333333	20.8	23	35.2	0.000217	4608	0.002025	0.002257	0.001664	0.00191
ORANGE (scatter-pay)	4	8	8	8	0.001736	576	0.006944	0.006944	0.00463	0.003472
STRAW (target)	4.666667	10.4	11.5	17.6	0.003906	256	0.018229	0.020313	0.014974	0.017188
STRAW (scatter-pay)	2	4	4	4	0.03125	32	0.0625	0.0625	0.041667	0.03125
					0.154297	6.481013	0.859616	0.86263	0.87321	0.883107

FIG. 5



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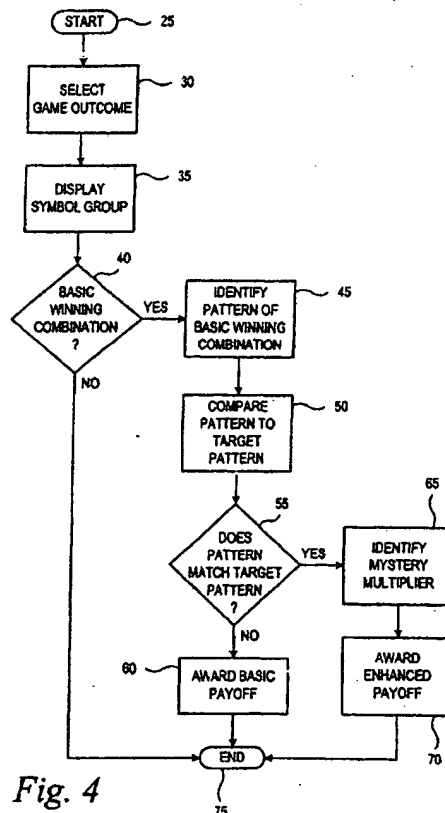
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(54) **Slot machine with pattern-driven award feature**

(57) A pattern-based award system for a slot machine. In one embodiment, a basic payoff is made if a symbol group displayed on the slot machine includes a basic winning combination and a supplemental payoff is made if the basic winning combination matches a target pattern. In another embodiment, an enhanced payoff is made if the symbol group displayed on the slot machine includes a basic winning combination which matches a target pattern; otherwise, a basic payoff is made if the symbol group includes a basic winning combination which does not match the target pattern. The basic payoff in each embodiment comprises a predefined amount of coin(s) or credit(s) or a randomly selected mystery amount. The supplemental or enhanced payoff is the product of the basic payoff amount and a randomly selected mystery multiplier.



**Fig. 4**

**EP 0 984 408 A3**



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 99 40 2158

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 196 14 114 A (ADP GAUSELMANN GMBH) 16 October 1997 (1997-10-16) * column 2, line 57 - column 3, line 13; claim; figure *	1,20,21, 40	G07F17/32
A	GB 2 316 214 A (SHOWA YUEN KABUSHIKI KAISHA) 18 February 1998 (1998-02-18) * page 10, line 8 - page 12, line 12; figures *	1,20,21, 40	
A	DE 36 38 099 A (NSM APPARATEBAU GMBH KG) 11 May 1988 (1988-05-11) * column 3, line 29 - column 4, line 15; figure 1 *	1,20,21, 40	
A	DE 36 28 745 A (GAUSELMANN PAUL) 25 February 1988 (1988-02-25) * column 3, line 43 - column 5, line 26; figure 2 *	1,20,21, 40	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			G07F
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>18 December 2001</b>	Examiner <b>Reule, D</b>
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EP 99 40 2158

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19614114	A	16-10-1997	DE 19614114 A1	16-10-1997
GB 2316214	A	18-02-1998	JP 3072057 B2	31-07-2000
			JP 10043388 A	17-02-1998
DE 3638099	A	11-05-1988	DE 3638099 A1	11-05-1988
DE 3628745	A	25-02-1988	DE 3628745 A1	25-02-1988

EPO FORM P0459

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